

## NEW AND LITTLE-KNOWN EAST AFRICAN CULICIDAE.

By F. W. EDWARDS.

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Collections recently received by the Imperial Bureau of Entomology, chiefly from Natal, have brought to light several interesting new forms in this group of flies, and their study has yielded certain unlooked for results which it appears desirable to place on record, together with descriptions of the new species, the types of which have been presented by the Bureau to the British Museum. The opportunity has been taken of publishing revised keys to the African species of *Banksinella* and *Taeniorhynchus*.

## Genus BANKSINELLA, Theo.

- |   |                               |
|---|-------------------------------|
| 1. Costa partly white or yellowish .. .. .  | 2                             |
| Costa entirely dark .. .. .   | 3                             |
| 2. Costa white on apical third or half ; proboscis unbanded ; hind tibiae mostly dark ; dorsum of thorax almost all white ; abdomen banded .. .. .  | <i>albicosta</i> , Edw.       |
| Costa with two yellow spots ; proboscis with a yellow median band ; hind tibiae with golden-yellow markings ; abdomen unbanded .. .. .  | <i>punctocostalis</i> , Theo  |
| 3. Wings entirely without yellow scales ; no well-defined yellow border to thorax ; abdomen unbanded .. .. .  | <i>fuscinervis</i> , Edw.     |
| Wings with yellow scales present, at least on the bases of the first and fifth longitudinal veins ; thorax normally with a well-defined yellow border .. .. .   | 4                             |
| 4. First longitudinal vein, and the lower branch of the fifth, yellow-scaled almost to their tips ; hind tibiae with a small apical yellowish spot ; middle tibiae rather conspicuously yellow on the hinder side, especially towards the tip .. .. . | <i>luteolateralis</i> , Theo. |
| First longitudinal vein dark-scaled beyond the base of the third vein .. .. .   | 5                             |
| 5. Hind tibiae with a distinct pale spot at the apex ; proboscis with a more or less distinct yellow ring in the middle ; abdomen unbanded, at least on the basal segments .. .. .  | 6                             |

- Hind tibiae without a distinct apical pale spot,  
 though they may be pale beneath throughout  
 their whole length; proboscis unbanded;  
 abdomen distinctly banded .. .. . *lineatopennis* (Ludlow)
6. Male claspers hairy at the tip, and bearing a  
 stout blunt-ended spine .. .. . *palpalis* (Newst.)
- Male claspers not hairy at the tip, bearing only  
 a long, curved, tapering spine .. .. . *taeniarostris*, Theo.

Of the above seven species, four (*punctocostalis*, *fuscinervis*, *palpalis* and *taeniarostris*) are, so far as we know at present, confined to West Africa, and two (*albicosta* and *luteolateralis*) to East Africa.

**B. albicosta**, Edw.

This was described by me (Bull. Ent. Res., iv, p. 47) as a variety of *B. luteolateralis*. There is very little doubt, however, that it should stand as a distinct species. No additional specimens have been received.

**B. luteolateralis**, Theo.

Theobald's original series consisted of specimens from Durban (Natal), Salisbury (Rhodesia), and the Malay States, a female from Durban being selected as the female type and a specimen from Salisbury being chosen to represent the male. Recently I have re-examined these specimens and found that Theobald had made the error of associating two forms under one name and placing a type label on a specimen of each. In this case there can be no doubt that the specimen on which his description was mainly based, was the female from Durban, and unfortunately this is very much the rarer of the two forms, being still unknown outside the original locality, while the other form (*B. lineatopennis*) is a common and widespread insect. There is room in this case for difference of opinion as to whether the two should stand as species or varieties, but as I have seen no African specimens at all intermediate, I prefer to regard them as species, though apart from the characters given in the key there is little difference between the two.

A good series of females, and one male of the true *B. luteolateralis* have recently been received from Durban (*L. Bevis* and *C. B. Cooper*). The male genitalia are extremely similar to those of *B. lineatopennis*, but the spine at the tip of the claspers appears to be thicker and more blunt-ended.

**B. lineatopennis**, Ludlow.

I have previously given this as a synonym of *B. luteolateralis*, but it proves to be distinct by the characters just mentioned. It is widely spread in both the Ethiopian and Oriental regions, but in Africa (where it is by far the most abundant member of the genus) it is much commoner in the southern and eastern portions of the continent. The species is rather variable: sometimes the yellow scales of the thorax are replaced by whitish ones (vars. *pallida* and *albothorax*) and sometimes there are a few or numerous yellow lateral scales on the second and fourth longitudinal veins.\*

\* Carter (Ann. Trop. Med., vii, p. 583, 1913) has given a good figure of the genitalia of this form, and also of *B. palpalis*.

## Genus OCHLEROTATUS, Arrib., Edw.

**O. hirsutus**, Theo.

Theobald (Union of S. Afr., Second Rept. Vet. Research, p. 328) has criticised my statement that his *Culex hirsutum* and *C. transvaalensis* are one and the same species. I have re-examined the specimens, and find no reason to modify my previous opinion, except in one particular. The male and female types of *C. hirsutum* belong to different species, and it was perhaps owing to his confusion of the two that Theobald was unable to agree with my findings. The female type must be taken as the type of the species, the male (the specimen figured in Bull. Ent. Res. ii, p. 249) being really *O. nigeriensis* (Theo.). These species, as previously pointed out, can be readily distinguished by the colour of the wing-scales, but for their better definition, I now give figures of the male genital claspers of each (fig. 1, *d* and *e*).

Unrecorded localities for *O. hirsutus* are: BRITISH EAST AFRICA: Moyale, 1. v. 1913 (*Dr. G. R. H. Chell*); PORTUGUESE WEST AFRICA: Bihé (*Dr. C. Wellman*).

**O. chelli**, sp. nov.

♀. *Head* clothed with yellowish-ochreous narrow curved and upright forked scales, only a few flat ones at the sides. Basal joint of antennae with small flat ochreous scales. Palpi and proboscis entirely black-scaled. *Thorax* with the integument dark brown, clothed with light ochreous brown scales at the sides, darker brown ones in the middle. Scutellum with narrow pale ochreous scales. *Abdomen* marked somewhat as in *O. dorsalis*: it is dark brown, with ochreous basal bands on each segment and with a continuous median longitudinal stripe of the same colour; towards the apical margins of the fifth, sixth and seventh segments this stripe broadens out considerably. Scales of venter ochreous. *Legs*: femora and tibiae strongly mottled with dark brown and pale ochreous scales, the femora entirely pale on their inner or posterior surfaces, except towards the tip. Tarsi of all the legs dark brown, the first joint with a fairly broad but ill-defined pale ring at the base, second and third joints with very narrow basal pale rings, fourth joint with a mere trace of such a ring; fifth entirely dark. Claws toothed (hind pairs missing). *Wings* with dark brown scales, and a few scattered pale ones on the median series; scales of lateral series linear. Upper fork-cell with its base nearer the apex of the wing than the lower.

*Length* about 5 mm.

BRITISH EAST AFRICA: Dido, 30. xi. 1911 (*Dr. G. R. H. Chell*), 3♀.

These specimens answer in many respects to Neveu-Lemaire's description of *Taeniorhynchus africanus*, but there are several discrepancies, and on the whole it seems most probable that Neveu-Lemaire's species was only *O. dorsalis*, some disagreement notwithstanding. The present species is named in honour of the collector, the only person who has up to the present collected mosquitos in this interesting district of British East Africa.

**O. bevisi**, sp. nov:

♀. *Head* clothed mainly with pale ochreous scales, but the usual spot of dark brown ones is present on each side. Scales narrow and curved in the middle and round the eyes, broad and flat at the sides, the latter reaching not far short of the



middle line. Palpi blackish brown, with creamy tips. Proboscis dark brown at the base and apex, ochreous in the middle two-thirds beneath and at the sides. First two joints of antennae with small flat ochreous scales, the basal joint ochreous. *Thorax* dark brown, clothed with narrow brown and ochreous-brown scales without any definite pattern. Scutellar scales narrow. Flat ochreous scales on the pleurae. *Abdomen* dark brown, each segment with whitish basal lateral spots and median bands not connected with the spots. Venter whitish ochreous, the apical margins of the apical segments black. *Legs*: femora without any intersprinkling of light and dark scales, pale knee-spots very distinct. Tibiae blackish, on the front and middle legs largely pale on their outer and posterior faces; hind tibiae with a well-marked pale spot at the apex on the outside, which is about equal in length to the breadth of the tibia. Tarsi blackish; on all the legs there is a narrow ochreous ring embracing the tip of the first and the base of the second joint, and a still narrower ring embracing the tip of the second and the base of the third. All the claws toothed. *Wings* clothed with dark brown scales, those of the lateral series linear. Bases of fork-cells level.

*Length* about 5 mm.

NATAL: Umbilo, Durban; 1 ♀, 16. v. 1914 (type); 2 ♀, 13. ix. 14 and 1 ♀, 25. ix. 1914 (*L. Bevis*).

Readily distinguished from all other African species by the tarsal markings. Although small pale rings are present on these, the species seems to belong to the *dentatus*-group.

#### ***O. albocephalus*, Theo.**

A good series of specimens of both sexes of this species have been received from Durban (*E. C. Chubb* and *L. Bevis*). Previously it was only known in the male sex from West Africa. It proves to be of considerable interest owing to a marked difference of scale characters between the two sexes. In the male, the flat scales of the head extend up to the middle line in front, while in the female the middle area of the head is clothed with narrow scales; the scutellar scales in the male are broad, in the female narrow. No such sexual difference has been noticed in any other mosquito.

As I have previously pointed out (*Bull. Ent. Res.* iii, p. 21), the figure which Theobald gives (*Mon. Cul.* v, p. 206) as representing the male genitalia of *O. punctothoracis*, really depicts those of *O. albocephalus*. This figure, however, is by no means accurate, and a fresh one is therefore given herewith (fig. 1, c).

The female *O. albocephalus* can be distinguished from *O. quasiunivittatus*, which it otherwise closely resembles, by the much larger white spot at the apex of the hind tibiae, which is quite twice as long as the width of the tibia.

#### ***O. quasiunivittatus*, Theo.**

This species occurs side by side with *O. albocephalus* in Durban, a few females having been sent in by Mr. Chubb. What appears to be a good specific character, is the size of the pale spot on the hind tibia; this is very distinct, and is about equal in length to the diameter of the apex of the tibia, *i.e.* it is about as broad as long. The thoracic scaling is like that of the female *O. albocephalus*. The fact that this

species and *O. dentatus* differ markedly in the male genitalia has already been referred to, and the present opportunity is taken of figuring this difference (figs. 1, *a*, *b*). There are other well-marked genital distinctions between *O. quasiunivittatus* and *O. dentatus* besides those in the claspers, but as the latter are most readily seen (being usually visible even in a dried specimen), they alone have been figured.

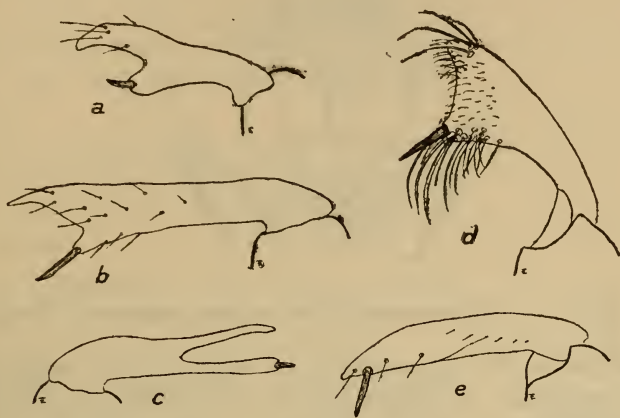


Fig. 1. Male claspers of:—(a) *Ochlerotatus quasiunivittatus*, Theo. ; (b) *O. dentatus*, Theo. ; (c) *O. albocephalus*, Theo. ; (d) *O. nigriensis*, Theo. ; (e) *O. hirsutus*, Theo.

#### ***O. dentatus*, Theo.**

This species also apparently occurs at Durban together with *O. albocephalus* and *O. quasiunivittatus*, though only female specimens have been received. It seems to differ from the other two in the thorax being darker, the pale scales having a tendency to a linear arrangement, and in the very small pale spot at the tip of the hind tibiae, which is never more than about half as long as broad. The best specific character is, however, the structure of the male genitalia (fig. 1, *b*). The species has been received from various localities in British East Africa.

#### ***O. pembaensis*, Theo.**

*Aedes pembaensis*, Theo., Mon. Cul. ii, p. 235 (1901).

*Skusea pembaensis*, Theo., Mon. Cul. iii, p. 291 (1903).

*Verrallina?* *pembaensis*, Theo., Mon. Cul. v, p. 495 (1910).

*Howardina?* *pembaensis*, Edw., Bull. Ent. Res. iii, p. 13 (1912).

*Aedes (Skusea) pembaensis*, Edw., Bull. Ent. Res. iv, p. 49 (1913).

As indicated above, this species has undergone many nomenclatorial vicissitudes, and it is not certain that it has even yet found a final resting-place, as it is one of those intermediate forms which make the classification of the *Aedes* group so difficult. Specimens representing both sexes have lately been sent in by Dr. W. M. Aders from Zanzibar, where the larvae were found living in stagnant water, 31. iii. 1914. The male palpi are as long as the proboscis, and though the last two joints are scarcely swollen, they are hairy and bent downwards as usual in *Ochlerotatus*, so that in spite of the simple claws of the female the species is probably better placed

in *Ochlerotatus* than in *Stegomyia* or *Aedes*. The male genitalia offer little assistance in classifying the insect, since their structure is so aberrant. The rather small but curiously complex hypopygium is almost hidden by the greatly developed seventh sternite (fig. 2).

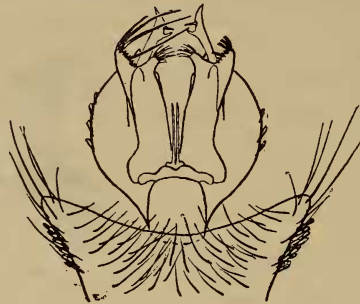


Fig. 2. Male armature of *Ochlerotatus pempaensis*, Theo.

The Oriental species, *O.* (" *Stegomyia* ") *micropterus*, Giles, would appear to be a near ally of *O. pempaensis*, as it resembles it in everything except the male genitalia and the more brownish tint; in *O. micropterus* the male genitalia and also the larvae (which have been found by Major James, living in bamboo stems in Ceylon) approach closely to the ordinary *Ochlerotatus* type.

Genus TAENIORHYNCHUS, Arrib.

1.	Tibiae all black or violet-black .. .. .	2
	Tibiae yellow, often with black rings .. .. .	3
2.	Violet-black species, thorax with a patch of whitish scales in front .. .. .	<i>metallicus</i> , Theo.
	Thorax shining black, abdomen golden-yellow .. .. .	<i>nigrithorax</i> , Theo.
3.	Hind tibiae entirely yellow .. .. .	4
	Hind tibiae with a black ring in the middle .. .. .	6
4.	Wing-scales and scales on palpi in both sexes all yellow .. .. .	<i>auripennis</i> , sp. n.
	Wings with some dark scales; tips of palpi black-scaled .. .. .	5
5.	Wings with dark scales almost confined to the sixth longitudinal vein .. .. .	<i>microannulatus</i> , Theo.
	Fourth, fifth and sixth veins mainly dark-scaled .. .. .	<i>chubbi</i> , sp. n.
6.	Golden-yellow species; costa entirely yellow; dark scales on wings few or absent .. .. .	7
	Darker species; costa with at least a few dark scales; dark scales on wings numerous .. .. .	9

- |     |  |                              |    |
|-----|--|------------------------------|----|
| 7.  | Claspers of male genitalia simple (Nyasaland) ..   | <i>chrysosoma</i> , sp. n.   |    |
|     | Claspers of male genitalia with a conspicuous<br>membranous lobe .. .. .   | .. ..                        | 8  |
| 8.  | Lobe of claspers moderate, moderately hairy<br>(Uganda, etc.) .. .. .  | <i>aurites</i> , Theo.       |    |
|     | Lobe of claspers enormous, very hairy (Natal)  | <i>aureus</i> , sp. n.       |    |
| 9.  | Thorax clothed (often sparsely) with small<br>golden-brown scales; scutellum bare; wings<br>with dark and light scales evenly inter-<br>mixed .. .. .    | .. ..                        | 10 |
|     | Thorax more densely clothed with pale golden<br>scales; scutellum thinly scaled; wings<br>with dark and light scales arranged more<br>in patches .. .. . | .. ..                        | 11 |
| 10. | Thoracic integument light brown in the<br>middle of the mesonotum and scutellum,<br>darker brown at the sides and in front ..                            | <i>fuscopennatus</i> , Theo. |    |
|     | Integument of mesonotum, scutellum and<br>postnotum entirely black or blackish brown   | <i>cristatus</i> , Theo.     |    |
| 11. | Costa entirely dark; thorax without a<br>distinct golden-yellow patch in front ..  | <i>versicolor</i> , Edw.     |    |
|     | Costa mainly yellow; thorax with a distinct<br>patch of pale golden scales in front .. .. .  | .. ..                        | 12 |
| 12. | Fork-cells very long; male genital claspers<br>much dilated just before the tip .. ..  | <i>annetti</i> , Theo.       |    |
|     | Fork-cells somewhat shorter; male genital<br>claspers not dilated .. .. .  | <i>maculipennis</i> , Theo.  |    |

The eight species from *auripennis* to *cristatus* are all very closely related, and some of them should perhaps rank as varieties, but appear to be distinct in one way or another.

#### **T. metallicus**, Theo.

This species proves to have a very wide distribution. Specimens have been received from British East Africa (Lumbwa district, *C. M. Dobbs*, and Uchweni Forest, *S. A. Neave*), Nyasaland (Karonga, *Dr. A. G. Eldred*) and Natal (Durban, *L. Bevis*). It is very probable that the species occurs also in the Philippine Islands, since some female specimens sent me by Miss Ludlow as her *T. aureosquamatus* seem to differ only from African specimens in their smaller size. Specific differences may, however, be revealed when the male is discovered in the Philippines.

#### **T. auripennis**, sp. nov.

An entirely yellow species, differing from *T. aurites* in the absence of the black ring in the middle of the hind tibiae, the narrower black rings on the joints of the hind tarsi, and the entirely yellow palpi. The male genitalia seem hardly



distinguishable from those of *T. aurites* or from those of *T. fuscopennatus*, though both of these species are distinct enough from *T. auripennis* and from one another in coloration.

UGANDA: Entebbe (Capt. E. D. W. Greig, I.M.S.), 1 ♂ 1 ♀ (types); SUDAN: Bahr-el-Jebel (Dr. A. Balfour), 2 ♀.

The specimens originally stood in the British Museum collection as *T. aurites*; subsequently I determined them as *T. microannulatus*, recording them as such in Bull. Ent. Res. iii, p. 26.

### *T. chubbi*, sp. nov.

An almost uniformly yellow species, like the preceding; there are, however, black scales on the tips of the palpi, the proboscis, and the tarsal joints, and scattered black scales on the femora; on the wings the scales of the fourth, fifth and sixth longitudinal veins are mostly black, so that to the naked eye the wing appears dark on the lower basal part and yellow elsewhere; on the remaining veins (except the costa) there are a few dark scales. The scales of the hind tibiae are appressed. The male genitalia closely resemble those of *T. aurites* except in the claspers (fig. 3, a), which are relatively larger and have a larger membranous lobe, and also are more hairy towards the tip. The clasper of *T. aurites* is shown for comparison (fig. 3, b).



Fig. 3. Male claspers of:—(a) *Taeniorhynchus chubbi*, sp. n.; (b) *T. aurites*, Theo.; (c) *T. chrysosoma*, sp. n.

NATAL: Umbilo, Durban, under mango trees and in grass near water, September 1914 (L. Bevis); 6 ♂ (including type) 2 ♀.

Named in honour of Mr. E. C. Chubb, Curator of the Durban Museum, who has greatly added to our knowledge of Natal Diptera, and through whom these specimens were received.

The much darker wings should be sufficient to distinguish this form specifically from *T. microannulatus*; no more satisfactory distinction can be pointed out, since the male of the latter is unknown.



**T. chrysosoma**, sp. nov.

Closely resembles *T. aurites*, except in the male genital claspers (fig. 3, e), which have no trace whatever of a membranous lobe. The scales on the hind tibiae seem to be more closely applied than in *T. aurites*, but this difference may not be constant.

NYASALAND: Karonga, ii. 1912 (*Dr. A. G. Eldred*), 2 ♂ (including type) 1 ♀.

**T. aureus**, sp. nov.

Appears to differ only from *T. aurites* in the male genital claspers, which are extremely similar to those of *T. chubbi*, differing only in the absence of the tuft of hairs just before the apex.

NATAL: Umbilo, Durban, in bush and in grass near water, 6.30-7 a.m., 24 and 25. ix. 1914 (*L. Bevis*), 7 ♂ (including type), 6 ♀.

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